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Sustainable Practices In Academic Institutions: A Strategic Roadmap For Green Campus Development

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This research aims to evaluate sustainable practices in higher education institutions, specifically focusing on developing green campuses in Pakistan. A 5-point Likert scale questionnaire was administered to collect data from 200 students and 100 professionals (administrative staff, facility and campus managers, sustainability officers, academic coordinators, and faculty members) across university campuses. SPSS is used to analyze the awareness, adoption, and effectiveness of green practices among these institutions. The findings reveal a significantly diverse interest in sustainability initiatives, highlighting progress and improvement in implementing environmentally friendly practices. The performance was evaluated in key areas, including energy efficiency, waste management, water conservation, and sustainable transportation, to portray Pakistan's current green campus paradigms. The study highlights the importance of integrating sustainability into institutional policies and curricula to foster a culture of environmental responsibility. This study offers recommendations to guide higher education institutions in adopting and implementing green practices through collaborative efforts. This research provides practical suggestions and measurable green indicators tailored to the Pakistani context, contributing to the growing knowledge on sustainable development in higher education. The results motivate policy reform and encourage universities to contribute to realizing global sustainability goals.

Keywords: Campus sustainability, higher education institutions, green indicators, sustainability awareness, Pakistan.

INTRODUCTION

In the late 1960s, the campus sustainability discourse grew to recognize the essential role that higher education institutions (HEIs) can play in shifting education and society toward a sustainable future (Flint, 2021; Gravett & Ajjawi, 2022; Halkiyo & Hailu, 2023; Hebbert, 2018). The Brundtland Report (1987) defined sustainable development as a process that provides present needs while sustaining the capacity of future generations to satisfy their requirements. This definition establishes an essential framework for maintaining equilibrium between economic development, societal fairness, and environmental protection, ensuring the future accessibility of water, materials, and energy resources.

The 1972 Stockholm Declaration established fundamental discussions about Sustainability in Higher Education (SHE) within academic institutions. The declaration outlined universities' responsibility with their leaders, researchers, lecturers, and students to apply their resources toward resolving conflicts between economic development and technological advancement while safeguarding natural environments (Guo & Mahat, 2023). The Kyoto Declaration of 1993 boosted HEI sustainability projects through its demand for operational rethinking alongside innovation-driven sustainability advancement. Through global initiatives, universities demonstrate that education is fundamental in preserving ecology and nature, establishing these institutions as vital agents of sustainable growth.

In recent decades, societies have witnessed the emergence of escalated environmental, social, and economic issues that call for immediate attention to individuals, businesses, government, and HEIs. Sustainable economic growth (defined as growth that does not compromise environmental integrity) is a central goal of policymakers across the globe (Austin & Sharr, 2021). To address these challenges, higher education institutions (HEIs) have more frequently adopted the concept of Green Universities (GUs) that focus on environmentally friendly practices and policies (Pedler et al.,

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2022; Thompson et al., 2023). Whether public or private, universities are seen as catalysts for positive change toward environmental and social ends. According to Soares et al. (2022), they shape societal values by teaching and training students about sustainable practices. These values, in turn, influence students' attitudes and perceptions towards their institutions. Two Lithuanian universities, one green and another non-green, have been studied by Dagiliūtė et al. (2018), and they also found several differences in students' attitudes and perceptions. As a result of implementing environmentally friendly initiatives and policies, Green University fostered more positive perceptions among the institution's students and sustainability-related activities.

In contrast, students attending a non-green university, following standard practices, were not into sustainability. The research results demonstrate that green campus environments contribute to student growth as environmentally responsible citizens. Numerous studies demonstrate that Higher Education Institutions are essential leadership institutions that protect economic sustainability and decrease environmental pollution. The educational institution enables sustainability by implementing sustainable practices in academic coursework, research, and operational activities (Leal Filho et al., 2018). The United Nations "2030 Agenda for Sustainable Development" and UNESCO's "Education for Sustainable Development," along with Paletta & Bonoli (2019) and Thompson et al. (2023) provide global declarations that have strengthened the enduring role of HEIs as developers of sustainable development bases. These programs prove that universities are perfect institutions to assist sustainable development by uniting educational efforts with research and operational services (Boys, 2022; Zhang et al., 2024).

The conceptual definition of a sustainable and green university requires the universal implementation of sustainable operational methods (Yu et al., 2018). The literature identifies multiple sustainable operational dimensions in green universities through studies on curriculum development, research activities, teaching practices, energy conservation, waste reduction, transportation patterns, community outreach, and documentation of sustainability achievements (Liu et al., 2018). The integrated dimensions enable the establishment of a sustainable and environmentally conscious campus that fulfills international sustainability objectives.

Green university practices are gaining increasing attention; there is a tremendous gap in empirical and conceptual research, specifically in developing countries like Pakistan. Although there have been limited studies on implementing green university concepts in these areas (Filho et al., 2019; Yu et al., 2018). There is a gap in the literature in a holistic framework that captures the multiple dimensions of sustainability.

Research on green university practices in European institutions is also relatively scarce (Hedden et al., 2017). This gap also signifies the need for a comprehensive study regarding the integration of the sustainability dimension into university operations in developing countries facing more severe economic and environmental challenges. The current study, titled “Green Campuses: Sustainable Practices in Schools and Universities," fills the gaps between theory and context by exploring how various aspects of sustainability are developed in parallel with other university constituents as different spheres constitute a university. An integrated environmental management approach is used to evaluate the implementation of green practices in Pakistani universities by incorporating students, faculty members, and professionals. This provides a unique way to look at the role of HEIs in fighting environmental degradation and promoting sustainable growth in developing countries.

A theory that is closely related to this study is the Environmental Kuznets Curve (EKC) theory, which posits that societies that are in the early stages of economic development, with low per capita income, usually cherish economic growth more than the environment (Wu et al., 2025) . The Environmental Kuznets Curve (EKC) hypothesis posits that environmental degradation initially increases with economic development but eventually decreases after reaching a certain income threshold. This study applies the EKC theory to higher education institutions by examining whether increased investment and awareness in Pakistani universities, despite being in a developing country, can lead to an inflection point where sustainable practices become more prominent. The findings will provide empirical insights into whether Pakistani HEIs are on a similar EKC trajectory regarding environmental performance. As economies mature and progress moves up income levels, more emphasis is put on environmental conservation (Manzoor et al., 2021; Vargas et al., 2019). In the case of Pakistan, a developing country with enormous environmental challenges, this study sets out to understand how HEIs can be utilized as a transformative idea to alter the order of precedence of societal values from unsustainable to sustainable (Gill et al., 2025).

The rest of the paper is organized as follows. Section 2 reviews the literature regarding Pakistani universities for critical components like research, teaching, community engagement, and campus operations. The literature describes how these components are operationalized in universities and how they can fuel sustainability. Section 3 outlines the research methodology. A 5-point Likert scale questionnaire examined green practices' awareness, implementation, and effectiveness, while the research analysts employed SPSS analysis. The research results appear in section 4 of the paper. Pakistani universities continue to transform from traditional resource-dependent systems to green-based campus operations, following the philosophy of Green Campus. Through its findings, the research delivers vital aspects regarding sustainability advancement and green practice obstacles, together with actionable recommendations to

advance university environmental stewardship initiatives. Section 5 concludes the study with recommendations and limitations of the study. The findings inform policy reforms and allow universities to assume a leading, global role in realizing sustainability goals.

Research questions

a. What is the current awareness and implementation of sustainable practices in Pakistani HEIs?
b. What are the key challenges and opportunities for developing green campuses in Pakistan?

This study adds to the literature on sustainable development in higher education by offering a holistic framework for conducting green actions across the university. University leaders need to implement a sustainability integration framework that includes measurable metrics for curricula and policies within the Pakistani context. The research aims to build an environmentally responsible culture that will transform higher education institutions.

This research contributes to a better understanding of the challenges and opportunities involved with implementing sustainability initiatives, especially in developing countries' universities, by looking at the experiences and perceptions of key stakeholders in Pakistan. By doing this, the study will provide helpful information for policymakers, university administrators, and other stakeholders attempting to induce sustainability in higher education. Based on the literature and observed trends, the study hypothesizes that while awareness of sustainable practices among Pakistani HEIs grows, actual implementation remains limited due to infrastructural, financial, and policy-related barriers. Universities with dedicated sustainability personnel and policies are also expected to demonstrate better alignment with Green Campus objectives.

MATERIALS AND METHODS

The study's objective was to determine sustainable practices for developing green campuses in higher education institutions in Pakistan. A quantitative study design was used to investigate Green Campus initiative awareness levels, acceptance, and their effectiveness among students and professionals. The research goal was to assess the present condition of green campus paradigms regarding their ability to manage energy-efficient construction, waste disposal, water preservation systems, and sustainable transit options. The investigation examined sustainability dedication and evaluated whether sustainability practices are integrated within university policies and curricula. A questionnaire with predetermined questions was developed to gather information concerning these elements from multiple institutional stakeholders. A 5-point Likert scale questionnaire served as the data collection method after adopting frameworks from sustainability research in higher education. Different sections of the questionnaire analyzed essential elements relating to green campus initiatives:

- Sustainability practices and awareness among students and professionals
- Adoption and implementation of environmental sustainability measures
- Effectiveness of current sustainability efforts as perceived by the consumer
- Integration of Green practices in the academic curricula at the institutional level and policies
- Identifies factors that impact the adoption of green practices on campuses.

The 300 sample participants participated in this study; 200 were students, and the other 100 were professionals in different higher education institutions in Pakistan. The institutions of choice were diverse in their places of origin, offering both urban and rural campuses. The research design included discipline and institutional type diversity, achieved through stratified random sampling. The researchers chose students and professionals according to their participation in sustainability programs and either green campus initiatives or university environmental management systems. SPSS (Statistical Package for the Social Sciences) processed the data from selected campuses to measure sustainability practice awareness, adoption, and effectiveness analysis of questionnaire responses, which involved descriptive statistics that included mean scores and frequencies in addition to percentages. Inferential statistical analysis was conducted on the data to determine if there are significant differences in sustainability perceptions based on demographics like participant role (i.e., student or faculty) and institutional or academic discipline type. Cronbach's alpha was used to perform a reliability analysis to measure the internal consistency of the Likert scale items (Olaniyi, 2019). The study was approved ethically by the relevant institutional review boards. All participants gave informed consent, having been made aware of the purpose of the study, confidentiality, and voluntary participation. All personal identifiers were removed, and the results were aggregated to ensure privacy.

***Proposed framework for adoption and monitoring of green practices*:** This research analyzes the current green campus practices before introducing a monitoring framework to improve the sustainability of higher education institutions. The framework directs institutions to cooperate with faculty members, students, and administrators while establishing sustainable campus practices. The framework incorporates three distinct recommendation blocks for sustainability implementation for institutions while establishing sustainable education programs and developing quantifiable environmental metrics. Study data demonstrates that institutional sustainability, cross-sectoral engagement, and commitment help maintain long-term environmental objectives and global sustainability targets.

RESULTS AND DISCUSSION

***Discussion on student responses*:** The distribution of the age of the respondents is critical to understanding the diversity of experience and standpoints among the student body. The analysis of respondents in Figure 1 shows an average age of 23.87 years, which shows that most of them are young adults studying at the undergraduate or early postgraduate level. The age range in the survey is 18 years to 30 years. This age range includes students at all academic levels to provide a well-diversified perspective of university sustainability issues. Figure 2 shows that, according to the survey results, the gender composition is relatively balanced. The sample comprises 102 female respondents, representing 51% of the total participants, while 98 male respondents form 49% of the population. Because of the near equal gender distribution, results include the views of male and female students, thereby minimizing bias toward males or females in the results. Respondents were from government and private universities, enabling a comparative analysis of the perception of sustainability across different institutional types. According to the data, 109 students (54.5 %) were from government universities, and 91 (45.5 %) were from private universities, as shown in Figure 3. This distribution ensures a fair representation of both types of universities to evaluate how institutional settings may affect students' awareness and engagement with sustainability practices.

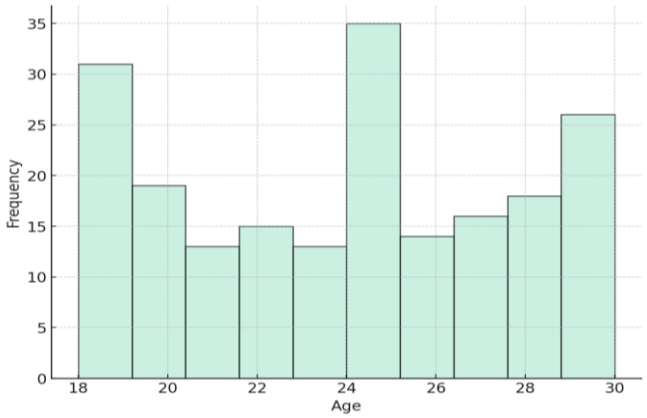

Figure 1. Age distribution of student respondents.

Analysis of student responses in Table 1 reveals a deep understanding of how environmental sustainability is perceived in universities. However, findings reveal that the relationship between the expectations of students and the implementation of sustainability practices by their institutions is rather complex. Students consider environmental issues important, but their satisfaction with them is dispersed (Thompson et al., 2025). Environmental management on campus was valued moderately, with a mean score of 2.995. Students acknowledge the importance of environmental management; their opinions diverge on implementing it. The standard deviation value of 1.43 shows that students have different views. Results from correlation analysis indicated a low positive connection between how students rated environmental management importance versus their satisfaction levels regarding its implementation. The low satisfaction levels reveal students' awareness of environmental importance and their doubts about institutional efforts to tackle it (Holt et al., 2019).

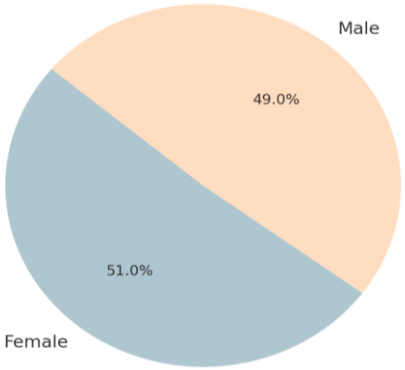

Figure 2. Gender distribution.

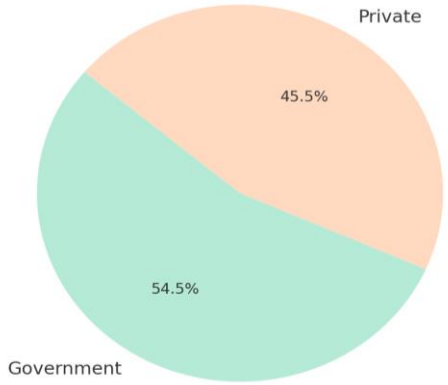

Figure 3. University-type distribution of student respondents.

Environmental management satisfaction among students reached a moderate level based on their average score of 2.715, indicating moderate dissatisfaction. Measurement using a standard deviation of 1.36 points to a mix of instrumental students who approve of activities and numerous discontented students who are less pleased. Other decisive factors dominate the students' overall evaluation of environmental management despite their minimal relationship with accessible green spaces and energy-saving practices. The model needs to embrace elements including

policy disclosure practices as well as student engagement protocols and mechanisms to showcase the degree of impact (Holt et al., 2019). The mean score of 2.91 reveals that students value campus green spaces highly. They rate their availability at 2.81, indicating that their expectations are mismatched.

Table 1. Descriptive statistics of student responses (N=200).

Items	Mean	S D
Environmental management is important for a university campus	2.995	1.43011
I am satisfied with the environmental management of my university	2.715	1.35757
The availability of green space on campus is important to me	2.91	1.45343
My university provides enough green spaces to support a high quality of life	2.81	1.39053
Energy-saving practices are essential for my university	3.19	1.37234
My university's energy-saving practices support a high quality of life	3.07	1.40329
Climate change mitigation programs are vital for my university	2.85	1.47934
My university actively implements measures to reduce greenhouse gas emissions	3.07	1.48868
Waste management is an important practice for my university	2.93	1.37851
My university's waste management efforts support a high quality of life	3.12	1.35454
My university's water management supports a high quality of life	2.97	1.39601
My university's transportation system supports a high quality of life	3.00	1.44236
My university offers sufficient environmental education programs	2.87	1.42814
I am satisfied with the overall quality of life on my university campus	3.16	1.41222
If I were applying to a university, the Green Campus status would be one of my selection criteria	3.05	1.43607
My university's Green Campus status contributes to a high quality of life on campus	2.96	1.41720

According to correlation analysis, green space satisfaction positively impacts students' overall quality of life without being an essential factor in their satisfaction with environmental management. Educational institutions need to devote additional resources to expanding green spaces because doing so will fulfill student expectations and create enhanced campus atmospheres (Dagiliūtė et al., 2018). Students feel that maintaining energy-saving practices needs attention; the average score is 3.19. The connection between students' assessment of energy-saving significance and university energy conservation activities proves weak (0.07). Students recognize energy-saving functions as important, but they doubt universities effectively carry out their energy-saving initiatives and maintain proper communication channels about their work. More awareness campaigns and transparent communication about campus energy reduction efforts should become priorities because students lack sufficient understanding of energy reduction activities (Chen et al., 2025).

In particular, the subject of climate change mitigation is an interesting one. Despite this, students recognize the need for such programs (mean 2.85), but they still perceive the actions of the university in this regard to be lower; namely, the initiation of such programs is not supported soon enough (mean 2.46), and the actual programs that have been initiated are perceived by students to be ineffective (mean 2.94). The association between these aspects is a weak correlation of about -0.1, showing that students do not correlate their universities' sustainability programs with effective climate action (Liu et al., 2018). This could suggest that institutions need to be more proactive in promoting their roles in mitigating the climate by undertaking specific and targeted initiatives and public engagement. Waste and water management were considered to receive moderate emphasis, with a mean of 2.94, while water management was 2.97. In addition, mean satisfaction with waste management efforts was slightly higher (3.12). Analysis of correlations proves that waste and water management positively influence overall quality of life (Zhang et al., 2024) . This shows that enhancing these services will increase student satisfaction and perceptions of campus sustainability. Moderate satisfaction scores were observed for education in transportation and education in the environment, with means of 3.0 and 2.87, respectively. While important, the correlation with overall satisfaction is weak, suggesting that while students may enjoy these features, they are not strong predictors of their campus experience. For universities that aim to increase sustainability, there should be more focus on higher-impact areas like waste management, energy efficiency, and green spaces (Nor et al., 2024).

University students consider Green Campus status a moderate factor during their university selection process, with an average score of 3.05. Student-perceived quality of life shows no significant relationship with Green Campus status, thus indicating that higher education institutions should establish stronger connections between their sustainability initiatives and actual student advantages. Students' opinions about university sustainability could improve with better communication and active engagement in their sustainability efforts (Nor et al., 2024; Zhang et al., 2024). The participants assessed their campus quality of life at a middle level on a scale from one to five (3.16 is the average score). The overall quality of life showed its strongest links with techniques dealing with waste disposal provisions of green spaces and the establishment of energy-saving measures. Students perceive these elements as major contributors to their satisfaction with campus existence. Students value

sustainability initiatives, although their satisfaction levels with university sustainability efforts align with those who do not perceive such efforts as important (Thompson et al., 2025). To achieve better results, universities require improved implementation, greater visibility, and better communication about their sustainability programs. Universities need to take three crucial steps, student participation and effective policy execution alongside enhanced facilities that match student expectations for sustainability programs.

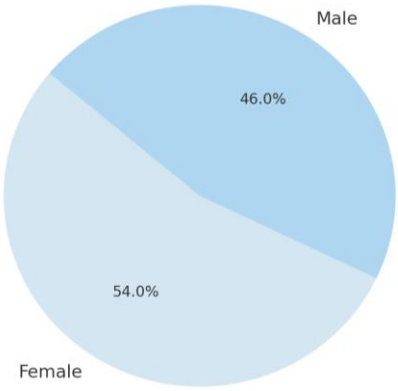

Figure 4. Gender distribution of professional respondents.

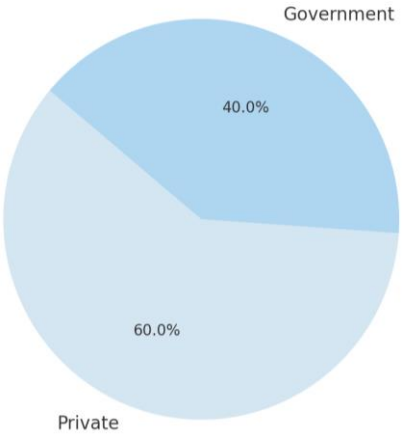

Figure 5. University-type distribution of respondents.

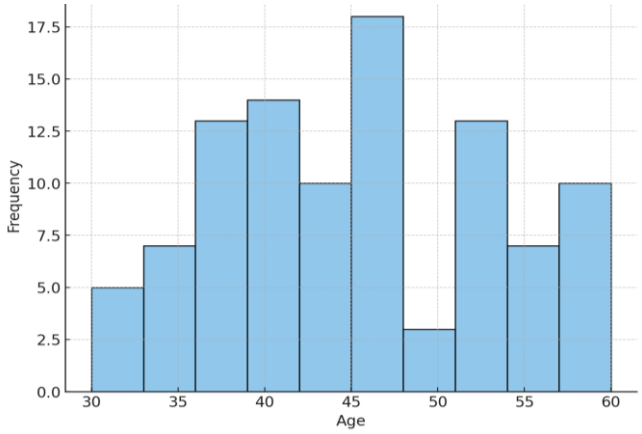

Figure 6. Age distribution of professional respondents.

Table 2. Descriptive statistics of Professional responses (N=100).

Items	Mean	Std
Environmental management is important for a university campus	3.03	1.36667
My university prioritizes reducing greenhouse gas emissions	2.96	1.37745
My university is effective in minimizing waste through recycling and reuse	3.1	1.44600
My university invests in sustainable energy sources	2.92	1.36833
My university supports community development initiatives	3.04	1.38477
Employee welfare and well-being are considered a top priority at my university	2.86	1.37084
Diversity and inclusion are integral to my university's culture	3.12	1.40187
My university efficiently allocates resources to ensure long-term sustainability	3.01	1.44596
My university maintains financial stability while adhering to sustainability principles	2.95	1.45210
Sustainability practices have positively influenced the financial performance of my university	3.09	1.50484
My university regularly monitors compliance with environmental regulations	2.92	1.50876
Transparent reporting of sustainability practices is part of my university's strategy	2.71	1.50618
My university actively involves students and faculty in sustainability initiatives	3.11	1.38458
Feedback from stakeholders is integrated into the university's sustainability strategies	3.16	1.33121

***Discussion of professional responses*:** Demographic analysis of professional responses helps provide a more comprehensive view of who discusses sustainability within the context of universities. The gender distribution also shows in Figure 4 that more female respondents (54%) are involved than male respondents (46%). A near balance of these perspectives suggests that the insights of a diverse professional contribute to shaping sustainability perspectives

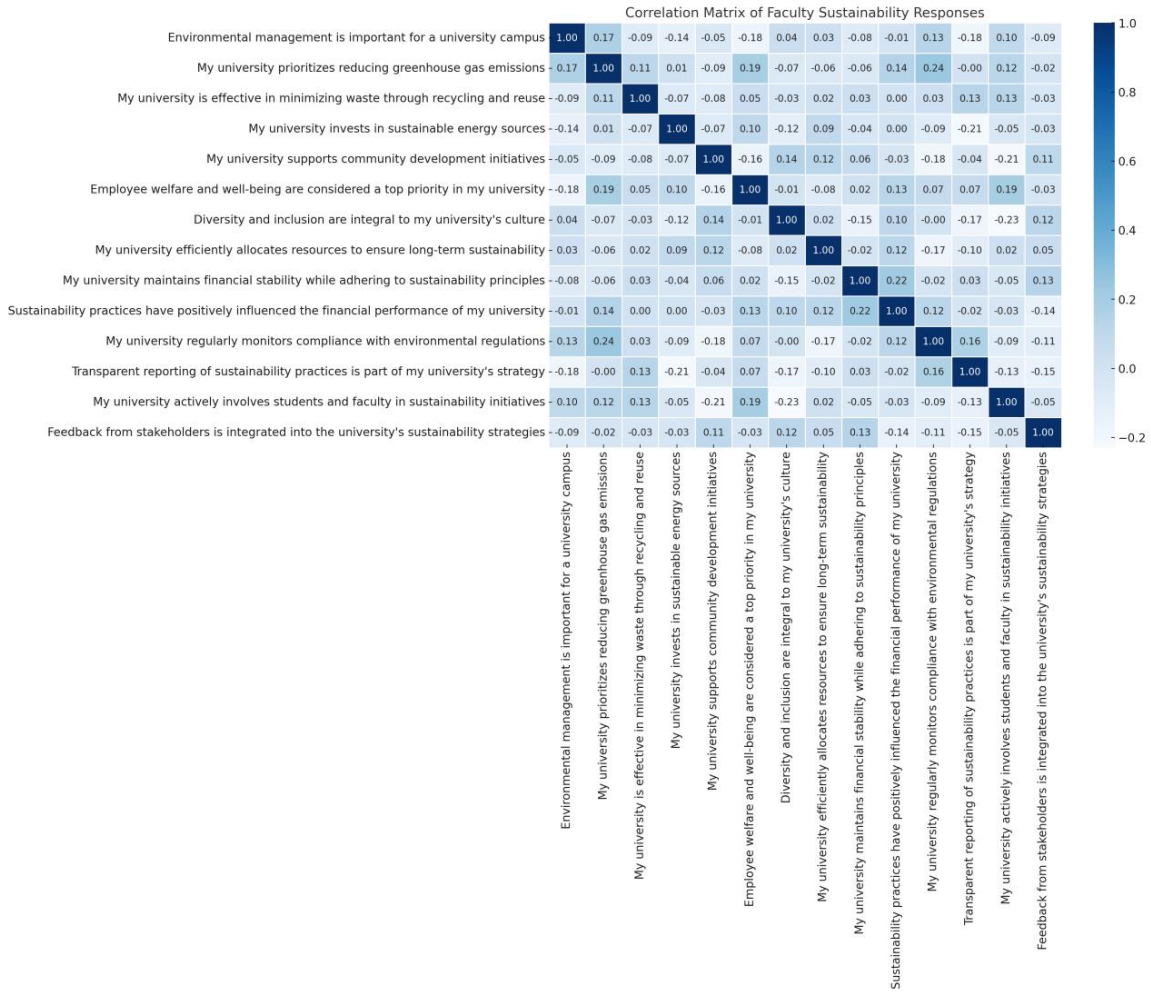
Correlation Matrix of Faculty Sustainability Responses
Environmental management is important for a university campus
My university prioritizes reducing greenhouse gas emissions
My university is effective in minimizing waste through recycling and reuse
My university invests in sustainable energy sources
My university supports community development initiatives
Employee welfare and well-being are considered a top priority in my university
Diversity and inclusion are integral to my university's culture
My university efficiently allocates resources to ensure long-term sustainability
My university maintains financial stability while adhering to sustainability principles
Sustainability practices have positively influenced the financial performance of my university
My university regularly monitors compliance with environmental regulations
Transparent reporting of sustainability practices is part of my university's strategy
My university actively involves students and faculty in sustainability initiatives
Feedback from stakeholders is integrated into the university's sustainability strategies
1.0
0.8
0.6
0.4
0.2
0.0
−0.2

Figure 7. Correlation matrix of professionals' responses.

in academia and could help ensure a comprehensive approach to environmental and institutional policies. Concerning institutional representation, most (60%) of respondents belong to private universities, while 40% of the professional responses are from government universities, as shown in Figure 5. This difference may suggest that the drawing of institutional types to sustainability initiatives differs. Government institutions differ from private universities regarding sustainability strategies, funding allocations, and policy frameworks in which professional members perceive and experience these initiatives. The age distribution of respondents further enriches demographic analysis since professional members include individuals at all levels of professional experience. The age of respondents has a mean of 44.63 years (s.d., ~7.88 years), indicating the mix of early and senior career professional that completed the survey. The respondents ranged from 30 years of age to as old as 60 years of age, as shown in Figure 6. Representing this distribution implies that individuals at various career stages are developing sustainability perspectives, and the effects of diverse career stages can promote an individual's attitude toward the university's long-term environmental planning and resource management.

Analysis of professional responses provides insight into how various universities perceive and implement sustainability practices. The breakdown of the demographic distribution is well-balanced between professional members from private and government institutions, and the gender ratio is almost equal. The diverse age distribution of the respondents shows that there were professional members from every level of experience; hence, different perspectives contributed to the surveys. This diversity ensures a balanced view of the sustainability initiatives in academic institutions, as shown in Table 2. Environmental management was an important factor on university campuses, with an average response of 3.03. However, sustainability-related efforts (i.e., greenhouse gas reduction and waste recycling) were slightly below average (mean=3.10 and 2.96, respectively). It indicates that, although

professionals acknowledge the significance of sustainability, they may think existing programs are not being fully embraced or enforced (Lutfu, 2020). Secondly, the score for investment in sustainable energy sources was relatively lower (2.92), proving a gap in allocating resources to solutions for green energy.

Additionally, community development and employee welfare responses show a moderate level of satisfaction with scores of 3.04 and 2.86, respectively. In other words, universities are trying to incorporate sustainability into broader community initiatives, but questions remain about how employee well-being fits within these efforts. Diversity and inclusion in university culture scored 3.12; again, high but not overly strong perceptions of inclusivity in sustainability strategies. Financial sustainability was also one of the most critical aspects of the analysis (Aleixo et al., 2018). On the efficient allocation of resources for long-term sustainability and financial stability, the professional perceptions scored around 3.01 and 2.95, respectively. These findings imply that universities face complex challenges in reconciling sustainability goals with financial constraints and may not fully implement long-term sustainable solutions (Soini et al., 2018). Correlation analysis importantly showed that financial stability and sustainable practices are interconnected, highlighting the significance of strategic planning in university funding.

Compliance with environmental regulations and transparent sustainability reporting also scored lower (2.92 and 2.71, respectively), signifying possible loopholes in monitoring and communication. Sustainability reporting may not be as transparent as professional might expect or may not have consistent compliance efforts. The relatively moderate rating (3.16) for stakeholder feedback integration further supports the need for universities to enhance their processes of leveraging professional and student input for sustainability strategy (Filho et al., 2020). Our professional response findings highlight it is a blended perspective on sustainability efforts in universities: professional recognize environmental management is essential but also doubt the implementation, resource allocation, and financial stability of sustainability efforts, as well as policy awareness and enforcement (Berchin et al., 2018). Universities should see it as a key task to fill these gaps through transparent communication of sustainability policies, increased investment in sustainable resources, and maximizing employee well-being and inclusion. Additionally, a more sustainable and inclusive academic environment could be built by increasing sustainability reporting transparency and strengthening stakeholder engagement (Filho et al., 2019b; Fuchs et al., 2022).

***Conclusion*:** This study offers a complete analysis of the awareness, adoption, and effectiveness of green campus initiatives of higher education institutions in Pakistan. The results suggest that students and professionals realize the importance of sustainability, but there is a wide gap between expectations and implementation regarding sustainability. Participants expressed moderate satisfaction while noting differences between sustainability programs related to waste management and energy efficiency and green space and climate change mitigation efforts. The research establishes that universities should actively engage in sustainability governance and policy implementation while increasing stakeholder engagement. The Green Campus initiative becomes more effective through open environmental reports backed by sustainable infrastructure spending and sustainability education services in educational institutions. The institution provides transparent environmental reporting, financial investments build sustainable infrastructure systems, and sustainability lessons enter all college teaching programs. Green campus initiatives achieve their highest level of enhancement. The demographic study reveals that students and professionals in multiple institutions with different sustainability views across public and private universities need programs focusing on various sustainability approaches. All Green campus efforts in Pakistan benefit from the value provided by this study, though certain restrictions exist. Data from participants submitted to researchers was based on self-reporting, making responses susceptible to possible response biases. Measurements were taken to protect participant anonymity, but social desirability bias potentially affected answers regarding the adoption of the adoption of sustainability practice. The research focused on particular Pakistani universities while excluding additional education institutes nationwide. The research results cannot be applied as a general conclusion to all Pakistani universities and universities in other areas.

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***Availability of data and material*:** The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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***Informed consent*:** Informed consent was obtained from all participants prior to their involvement in the study.

***Consent to participate*:** All participants voluntarily agreed to take part in the study after being informed about the purpose and use of the research.

***Consent for publication*:** All authors have reviewed the manuscript and consent to its publication.

***SDGS addressed*:** Quality Education, Affordable and Clean Energy, Sustainable Cities and Communities, Climate Action
***Policy referred*:** International and Global Sustainability Policies; PK National and Institutional-Level Policy Implications; Brundtland Report (1987); Stockholm Declaration (1972); Kyoto Declaration (1993).

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